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1. The first step is to identify the problem. This involves understanding the current situation and what needs to be changed.

ACTIVE LABELS FOR PRODUCTS

RELATED APPLICATION

This application is a continuation-in-part of U.S. Patent Application Serial No. 08/770,712 filed on December 19, 1996 entitled "Active Labels for Garments."

FIELD OF THE INVENTION

The present invention relates generally to the field of labels and tags for products and more particularly to electronic labels for products.

BACKGROUND OF THE INVENTION

It is typical for the manufacturer of a product to affix a label to the product which bears the manufacturer's brand name or logo. Labels are also used to describe the material contents of a product, to give care instructions, or to display manufacturer information, such as the manufacturer's RIN number in the case of clothing products. Because labels are typically small, they can carry only a limited amount of information. Therefore, it is not at all uncommon to find two or more labels affixed to different locations of a single product. For example, a shirt may carry a brand label which is placed in a visible location, and a neck label to give product information. However, there is a small, finite limit to the number of labels which can be applied to a product without cluttering the product.

Another problem with conventional labels for products is that only static designs and information can be contained in the label. Animated designs and logos are not possible with conventional woven, printed or stamped labels. Also, conventional labels cannot display information which may change over time.

SUMMARY OF THE INVENTION

The present invention is an active label for products that is characterized by a changeable display. The label includes a thin, flexible LCD panel on which various types of label information can be displayed. The LCD panel is contained in a water-tight encasement made from an elastomeric material which can be affixed to a product. The label can be attached to products by any suitable means, which will vary depending on the product.

The label information which is displayed can include a company name and/or logo, material content information, care instructions, source information, e-mail address, web page address, telephone numbers or other source information which the manufacturer or seller wants to include on the label. This information can be included in multiple screen images which can be advanced by pressing a button or touch-sensitive input on the display. Also, information which changes over time can be displayed.

The active label of the present invention obviates the need for placing multiple labels on products as is the current practice. Moreover, the active label of the present invention can display animated logos or changing information which is not possible with current labels. The active label is particularly useful for products that do not have a display as an inherent feature of the product.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded perspective view showing one embodiment of the active label of the present invention.

Figure 2 is a section view of the active label.

Figure 3 is a front view showing one embodiment of the active label.

Figure 4a-4c are front elevation views of an active label having multiple display screens.

Figure 5 is a front elevation view of another active label including a touch-sensitive input

Figure 6 is a front elevation view of an active label including a solar cell and touch-sensitive input

Figure 7 is a front elevation of a shirt with an active label attached thereto.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the drawings, and particularly to Figure 1, an active label for products is shown and indicated generally by the numeral 10. The active label is particularly useful for products that do not otherwise include a display as an inherent feature of the product, but may also be used in other circumstances. For example, in products that include a display as a functional feature of the product, the manufacturer may still use the active label 10 of the present invention to provide a separate, dedicated display for displaying trademarks, logos, brands, or slogans. In this case, the active label 10 comprises a display that is not associated with the inherent functioning of the product.

The active label 10 of the present invention includes an electronic display 20 for displaying label information and a case 40. For purposes of this application, the term "label information" means a brand name, logo, or slogan which identifies the source or origin of the product; product information, or source information. "Product information" means information about the features, use, or care of the product to

which the label 10 is attached. "Source information" means information concerning the manufacturer, seller, or source of the product, such as an address (including an e-mail address) or telephone number for contacting the company, or an address of a web page for finding additional information about the company and its products.

The electronic display 20 is preferably a liquid crystal display. The display 20 comprises a display panel 22, a backlight panel 28 to backlight the display panel 22, and a circuit board 30 containing an integrated circuit which provides power, data, and control signals for operating the display 20. The display panel 22 is, as already mentioned, a liquid crystal-type display which comprises liquid crystal composites disposed between upper and lower substrates. Display elements are formed by etching a conductive film deposit on the inner surface of each substrate. Etched areas become the display background; unetched areas become the display elements. When a voltage potential is applied, the display elements becomes visible. The display elements can be individually addressed (i.e. their conductive surfaces energized) to selectively activate the display elements. The display panel 22 may be either a monochrome display or a color display. Also, the display panel 22 could be a passive matrix or active matrix display.

Numerous types of LCD panels can be used in connection with the present invention including reflective, transmissive, or transfective panels. However, transfective LCD's are best suited for practicing the present invention because the display elements are visible in a wide variety of lighting conditions including both outdoor and indoor lighting conditions. Transfective displays include a backlighting panel 28 to backlight the display panel 22. Light-emitting diodes (LEDs) 28 provide a light source. The light is transmitted by the backlight panel 28, which serves as a light guide. An electroluminescent panel could also be used as a backlight for the display panel 22. LED backlighting is preferred, however, because of its longevity. The backlight 28a can be manually activated and deactivated by an illumination button 50 (see Fig. 3) on the label 10. Alternatively, the backlight can be activated by

a touch-sensitive input (i.e. touch screen) on the display panel 22, or by a sensor that senses a condition of the environment (e.g., the brightness of the environment).

The circuit board 30 contains all of the circuitry necessary to drive the display panel 22. The circuit board contains an integrated circuit which includes a memory 31, a microprocessor 32, a display driver 34, and power supply 36. Memory 31 stores label information and manufacturer information that is displayed by the active label 10, as well as program instructions used to control the operation of the active label 10. The processor 32 controls the operation of the active label 10 according to the program instructions stored in memory 31. The processor 32 retrieves the information from memory 31 to be displayed and generates display data that is output to the display driver 34. Display driver 34 controls the operation of the display panel 22 based on the display data from the microprocessor 32, such that the desired information is displayed.

The circuit board 30 includes a series of terminals 38 which are electrically connected to corresponding terminals (not shown) on the display panel 22. Such connection may be made for example by means of a conventional zebra-strip or similar conductive element. In certain cases, it may be necessary to locate the microprocessor 32 and driver circuits 34 remotely from the display panel 22. In these cases, the microprocessor 32 and driver circuit 34 can be connected to the display panel 22 by a conventional flex connector which is disposed between two-layers of the product. The advantage of locating the circuit components remotely from the display panel 22 lies in the reduction of the size of label 20 making it possible to keep the label 10 thin. The construction of LCD's is well-known to those skilled in the art and therefore will not be described in detail herein.

The case 40 comprises a base panel 42 and a window frame 44 which has a transparent window 46 for viewing the display 20. In one exemplary embodiment, the base panel 42 and window frame 44 are made of an elastomeric material such a flexible, sewable rubber that allows the active label to conform to contoured, as

opposed to flat, surfaces . During assembly, the display 20 is interposed between the base panel 42 and window frame 44. The window frame 44 is then glued or bonded to the base panel 42 to form a water-tight enclosure. The base panel 42 is larger than the window frame 44 so that a peripheral portion 48 of the base panel 42 extends outward from the window frame 44 on all sides. The perimeter portion 48 of the base panel 42 provides a convenient location for stitching to secure the label 10 to a product.

Referring now to Figure 3, there is shown a front view of an active label constructed in accordance with the present invention. The label 10 shown in Figure 3 has a generally square configuration. This embodiment uses only a single screen image for displaying a company logo and product information. An illumination button 50 is disposed along the bottom of the display panel 22 to provide a means to turn the backlighting on and off.

Figure 4 shows another embodiment of the active label 10 which includes multiple screen images and a button 50. The company's logo is displayed in the upper left corner of each of the display screens. The bottom half of the display 20 is used to display information such as the material content of the product, care instructions, manufacturer information, e-mail address, telephone numbers, or other information which the manufacturer wants to include on the label. A button 50 is disposed along the bottom of the display to advance the screen image and to turn the backlighting on and off. The button 50 is preferably a two-way toggle button. Pressing the left side of the toggle button 50 advances the screen image. Pressing the right side turns the backlighting on and off.

Figure 5 shows a third embodiment of the active label 10. In this embodiment, the display has an elongated, rectangular shape. The larger area on the left is an information screen on which the label information is displayed. The smaller area on the right where the company logo is displayed is a touch screen 52. The touch screen 52 includes two touch sensitive areas indicated by the triangular pointers.

The left pointer advances the display screen. The right pointer turns the backlighting on and off.

Figure 6 shows a fourth embodiment of the active label 10. In this embodiment, the label has a vertically oriented, rectangular configuration. The upper portion of the rectangle contains one or more solar cells 54 which can be used to power the display and/or recharge the display batteries. The lower portion of the label where the company logo is displayed is a touch screen 52. The middle portion of the label is an information screen. As in the previous embodiment, the touch screen can be used to advance the screen image and to turn the backlighting on and off.

Any suitable method of attaching the active label 10 to the product may also be used. For example, the label 10 may be secured to products by adhesives, by sewing or stitching, or by suitable fasteners, such as hooks, screws, buckles, snaps, VELCRO-type fasteners, or pins. The label 10 could also be entrapped or retained by other features of the product. For example, the label 10 could be designed as a cartridge which slides in a pocket or pouch on the product.

The present invention overcomes the problems associated with conventional woven or printed labels. Since the label can be programmed to display multiple screen images, only a single label is needed. Thus, the present invention provides a method to convey more information to consumers without cluttering the product with numerous labels. Also, the label can be easily programmed to automatically display a sequence of related images to provide an animated logo rather than a static logo.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.